

Atromos 2016: A Mars Companion Mission (IPPW-7)

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ABSTRACT

A Mars Companion mission involving two 10kg probes is studied for the 2016 opportunity. After separation from the main spacecraft bus 25 days prior to atmospheric entry, the two probes are targeted to the interior and exterior of the Hellas Basin. This region is of considerable interest in that: a) it is the presumed cause of the South Polar asymmetry, and b) it may contribute to the origin of larger scale global dust storms. After the simplified Entry/Descent/Landing (EDL) sequence, the delivered science stations remain functional for 90 sols and provide periodic meteorological and other data updates to the orbiting communication satellite. The mission is enabled by the self-stabilizing TDRV (Tube Deployed Re-entry Vehicle) re-entry probe design currently in development. A key attribute of this design is that it is self-orienting, which results in a simplification of the mechanical and operational interfaces to the spacecraft. The simple interface is critical if Companion missions are to come about with some regularity, which may provide a convenient means of injecting other technologies at minimum risk to other future missions. The basic probe design could be the basis of a 2 point network serving as a precursor to a larger Combined Mars Network mission, or could provide access to scientifically interesting areas of Mars deemed too risky for larger missions.